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ABSTRACT:

A device for scanning a first and second type of optical record carriers (2; 40) generates a first and a second radiation beam for scanning the first and second type of record carriers, respectively. The information layers (4; 42) of the first and second type of record carriers is scanned through transparent layers (3; 41) of different thickness. The first radiation beam (17) has a first wavelength and a first numerical aperture NA₁. The second radiation beam (46) has a different, second wavelength and an effective second numerical aperture NA₂ smaller NA₁. The rays of the second radiation beam having an NA smaller than NA₂ form a central sub-beam (48), the rays having a larger NA form an outer sub-beam (49). The device includes a non-periodic phase structure that does not affect the first radiation beam. The phase structure introduces an amount of spherical aberration in the central sub-beam (48). The phase structure is transparent for the central and outer sub-beam (48; 49). The introduced spherical aberration compensates the difference in spherical aberration caused by the difference in thickness of the transparent layer (3; 41) of the first and second type of record carriers (2, 40). To reduce the amount of stray light falling on the detection system (25) from rays in the outer sub-beam (49), the phase structure introduces an amount of defocus in the second radiation beam (17). The defocus displaces the focus of the central subbeam with respect to the focus of the outer sub-beam, causing the intensity distribution of the central and outer sub-beam to split in two separate distributions. If the position and size of the detection system are properly chosen, the detection system will capture mainly rays from the central sub-beam and not from the outer sub-beam. Hence, the displacement of the foci allows spatial filtering in the plane of the detection system (25) of the desired and undesired rays of the second radiation beam.

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Figure 1